Task2(Joins & Normalization)

Problem 1 (https://leetcode.com/problems/product-sales-analysis-i/?envType=study-plan-v2&envId=top-sql-50)

```
select product_name ,year ,price

from Product

inner join Sales

on Product.product_id = Sales.product_id ;
```

Problem 2 (https://leetcode.com/problems/customer-who-visited-but-did-not-make-any-transactions/?envType=study-plan-v2&envId=top-sql-50)

```
select v.customer_id , count(v.visit_id) as count_no_trans

from Visits v

left join Transactions t

on v.visit_id = t.visit_id

where t.transaction_id is null

group by v.customer_id;
```

Problem 3 (https://leetcode.com/problems/replace-employee-id-with-the-unique-identifier/description/?envType=study-plan-v2&envId=top-sql-50)

```
select coalesce(EI.unique_id, null) as unique_id , E.name

from Employees E

left join EmployeeUNI EI
```

```
on E.id = EI.id;
```

Problem 4 (https://leetcode.com/problems/rising-temperature/?envType=study-plan-v2&envId=top-sql-50)

```
select w1.id

from Weather w1

inner join Weather w2

on w1.recordDate = DATE_ADD(w2.recordDate, INTERVAL 1 DAY)

where w1.temperature > w2.temperature;
```

Problem 5

```
select E.emp_name,coalesce(D.dept_name, 'Unassigned') as dept_name

from Employees E

left join Departments D

on E.dept_id = D.dept_id;
```

Problem 6

```
select P.product_name, S.supplier_name

from Products P

left join Suppliers S
```

```
on P.supplier_id = S.supplier_id

where p.product_name like '%Phone%';
```

Problem 7

```
select concat(C.first_name, ' ', C.last_name) as
full_name,O.order_id,O.amount

from Customers C

left join Orders O

on C.customer_id = O.customer_id
```

Problem 8

0NF

BOOK_ID	BOOK_TITLE	AUTHORS	PUBLISHER_ID	PUBLISHER_NAME	PUBLISHER_CITY	GENRES
1	Database Systems	Silberschatz, Korth	101	McGraw Hill	New York	Computer, Education
2	Clean Code	Robert Martin	102	Prentice Hall	Boston	Computer
3	Design Patterns	Gang of Four	101	McGraw Hill	New York	Computer, Reference
4	The Pragmatic Programmer	Hunt, Thomas	102	Prentice Hall	Boston	Computer

1NF

LIBRARYBOOKS

BOOK_ID(PK)	BOOK_TITLE	PUBLISHER_ID	PUBLISHER_NAME	PUBLISHER_CITY
1	Database Systems	101	McGraw Hill	New York
2	Clean Code	102	Prentice Hall	Boston

BOOK_ID(PK)	BOOK_TITLE	PUBLISHER_ID	PUBLISHER_NAME	PUBLISHER_CITY
3	Design Patterns	101	McGraw Hill	New York
4	The pragmatic Programmer	102	Prentice Hall	Boston

Book_Authors

BOOK_ID	AUTHORS
1	Silberschatz
1	Korth
2	Robert Martin
3	Gang of Four
4	Hunt
4	Thomas

BOOK_ID	GENRES
1	Computer
1	Education
2	
3	Computer
3	Reference
4	Computer

2NF

LibraryBooks

BOOK_ID	BOOK_TITLE	PUBLISHER_ID	PUBLISHER_NAME	PUBLISHER_CITY
1	Database Systems	101	McGraw Hill	New York
2	Clean Code	102	Prentice Hall	Boston
3	Design Patterns	101	McGraw Hill	New York

BOOK_ID	BOOK_TITLE	PUBLISHER_ID	PUBLISHER_NAME	PUBLISHER_CITY
4	The pragmatic Programmer	102	Prentice Hall	Boston

Book_Authors

BOOK_ID	AUTHORS
1	Silberschatz
1	Korth
2	Robert Martin
3	Gang of Four
4	Hunt
4	Thomas

BOOK_ID	GENRES
1	Computer
1	Education
2	Education
3	Computer
3	Reference
4	Computer

3NF

BOOK

BOOK_ID(PK)	BOOK_TITLE	PUBLISHER_ID(FK)
1	Database Systems	101
2	Clean Code	102
3	Design Patterns	101
4	The pragmatic Programmer	102

PUBLISHER

PUBLISHER_ID(PK)	PUBLISHER_NAME	PUBLISHER_CITY
101	McGraw Hill	New York
102	Prentice Hall	Boston

GENRES

GENER_ID(PK)	GENERS_NAME
1	Computer
2	Education
3	Reference

AUTHORS

AUTHORS_ID(PK)	AUTHORS_NAME
1	Silberschatz
2	Korth
3	Robert Martin
4	Gang of Four
5	Hunt
6	Thomas

BOOK_AUTHER

BOOK_ID(FK)	AUTHER_ID (FK)
1	1
1	2
2	3

BOOK_ID(FK)	AUTHER_ID (FK)
3	4
4	5
4	6

BOOK_GENERE

BOOK_ID(FK)	GENERE(FK)
1	1
1	2
2	1
3	1
3	3
4	1

Problem 9

0NF

STUDENT_ID	STUDENT_NAME	STUDENT_EMAIL	COURSES	INSTRUCTORS	INSTRUCTOR_DEPT	DEPT_BUILDING
1001	Alice Brown	alice@uni.edu	CS101, CS102	Dr. Smith, Dr. Lee	Computer Science, Computer Science	Tech Hall, Tech Hall
1002	Bob Chen	bob@uni.edu	MATH201	Dr. Johnson	Mathematics	Science Center
1003	Carol Davis	carol@uni.edu	CS101, MATH201	Dr. Smith, Dr. Johnson	Computer Science, Mathematics	Tech Hall, Science Center

1NF

STUDENT

STUDENT_ID(PK)	STUDENT_NAME	STUDENT_EMAIL
1001	Alice Brown	alice@uni.edu

STUDENT_ID(PK)	STUDENT_NAME	STUDENT_EMAIL
1002	Bob Chen	bob@ubi.edu
1003	Carol Davis	carol@uni.edu

STUDENT_COURSE_INSTRUCTORS_INSTRUCTOR_DEPT_DEPT_BUILDING

STUDENT_ID	COURSES	INSTRUCTORS	INSTRUCTOR_DEPT	DEPT_BUILDING
1001	CS101	Dr. Smith	Computer Science	Tech Hall
1001	CS102	Dr. Lee	Computer Science	Tech Hall
1002	MATH201	Dr. Johnson	Mathematics	Science Center
1003	CS101	Dr. Smith	Computer Science	Tech Hall
1003	MATH201	Dr. Johnson	Mathematics	Science Center

2NF

STUDENT

STUDENT_ID(PK)	STUDENT_NAME	STUDENT_EMAIL
1001	Alice Brown	alice@uni.edu
1002	Bob Chen	bob@ubi.edu
1003	Carol Davis	carol@uni.edu

STUDENT_COURSE

STUDENT_ID	COURSES
1001	CS101
1001	CS102
1002	MATH201
1003	CS101
1003	MATH201

COURSES_INSTRUCTORS

COURSES	INSTRUCTORS
CS101	Dr. Smith
CS102	Dr. Lee
MATH201	Dr. Johnson

INSTRUCTORS_DEPARTMENT

INSTRUCTORS	INSTRUCTOR_DEPT
Dr. Smith	Computer Science
Dr. Lee	Computer Science
Dr. Johnson	Mathematics

DEPARTMENT_BUILDING

INSTRUCTOR_DEPT	DEPT_BUILDING
Computer Science	Tech Hall
Mathematics	Science Center

3NF

STUDENT

STUDENT_ID(PK)	STUDENT_NAME	STUDENT_EMAIL
1001	Alice Brown	alice@uni.edu
1002	Bob Chen	bob@ubi.edu
1003	Carol Davis	carol@uni.edu

COURSES

COURSE_ID(PK)	COURSES_NAME
1	CS101
2	CS102
3	MATH201

INSTRUCTORS

INSTRUCTORS_ID(PK)	INSTRUCTORS_NAME	INSTRUCTOR_DEPT_ID(FK)
1	Dr. Smith	1
2	Dr. Lee	1
3	Dr. Johnson	2

DEPARTMENTS

INSTRUCTOR_DEPT_ID(PK)	INSTRUCTOR_DEPT	DEPT_BUILDING_ID(FK)
1	Computer Science	1
2	Mathematics	2

DEPT_BUILDING

DEPT_BUILDING_ID(PK)	DEPT_BUILDING
1	Tech Hall
2	Science Center

STUDENT_COURSES

STUDENT_ID(FK)	COURSES_ID(FK)
1001	1
1001	2
1002	3
1003	1
1003	3

COURSES_INSTRUCTOR

COURSE_ID(FK)	INSTRUCTORS_ID(FK)
1	1
2	2
3	3

Problem 10

0NF

APPOINTMENT_ID	PATIENT_NAME	PATIENT_PHONES	DOCTOR_NAME	DOCTOR_ID	SPECIALIZATION	CLINIC_NAME	APPOINTME
1	John Smith	555-0101, 555-0102	Dr. Adams	201	Cardiology	Heart Care Center	2024-01-15, 2
2	Mary Johnson	555-0201	Dr. Brown	202	Dermatology	Skin Health Clinic	2024-01-18
3	John Smith	555-0101, 555-0102	Dr. Brown	202	Dermatology	Skin Health Clinic	2024-02-10

1NF

PatientAppointments

APPOINTMENT_ID(PK)	PATIENT_NAME	DOCTOR_NAME	DOCTOR_ID	SPECIALIZATION
1	John Smith	Dr. Adams	201	Cardiology
2	Mary Johnson	Dr. Brown	202	Dermatology
3	John Smith	Dr. Brown	202	Dermatology

PATIENT_PHONES

APPOINTMENT_ID	PATIENT_PHONES
1	555-0101
1	555-0102
2	555-0201
3	555-0101
3	555-0102

APPOINTMENT_DATES

APPOINTMENT_ID	APPOINTMENT_DATES
1	2024-01-15
1	2024-02-22
2	2024-01-18
3	2024-02-10

2NF

PATIENT

PATIENT_ID(PK)	PATIENT_NAME
1	John Smith
2	Mary Johnson

PHONES

PHONES_ID(PK)	PHONE	PATIENT_ID(FK)
1	555-0101	1
2	555-0102	1
3	555-0201	2

DOCTORS

DOCTOR_ID(PK)	DOCTOR_NAME	SPECIALIZATION	CLINIC_NAME
201	Dr. Adams	Cardiology	Heart Care Center
202	Dr. Brown	Dermatology	Skin Health Clinic

APPOINTMENR

APPOINTMENR_ID(PK)	APPOINTMENT_DATE	PATIENT_ID(FK)	DOCTOR_ID(FK)
1	2024-01-15	1	201
2	2024-02-22	1	201
3	2024-01-18	2	202
4	2024-02-10	1	202

3NF

PATIENT

PATIENT_ID(PK)	PATIENT_NAME
1	John Smith
2	Mary Johnson

PHONES

PHONES_ID(PK)	PHONE	PATIENT_ID(FK)
1	555-0101	1
2	555-0102	1
3	555-0201	2

DOCTORS

DOCTOR_ID(PK)	DOCTOR_NAME	SPECIALIZATION	CLINIC_NAME
201	Dr. Adams	Cardiology	Heart Care Center
202	Dr. Brown	Dermatology	Skin Health Clinic

APPOINTMENR

APPOINTMENR_ID(PK)	APPOINTMENT_DATE	PATIENT_ID(FK)	DOCTOR_ID(FK)
1	2024-01-15	1	201
2	2024-02-22	1	201
3	2024-01-18	2	202
4	2024-02-10	1	202